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EXAMINER
LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
1764	

DATE MAILED: 02/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/828,225	ALLISTON ET AL.	
	Examiner	Art Unit	
	Jennifer A. Leung	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4,5,7-14 and 17-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4,5,7-12,14,17-21 and 23-26* is/are rejected.

7)☒ Claim(s) *13 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed on November 29, 2004 has been received and carefully considered. The changes made to the Abstract are acceptable. Claims 1-3, 6, 15 and 16 are cancelled. Claims 24-26 are newly added. Claims 4, 5, 7-14 and 17-26 remain active.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 4, 5, 7, 17, 20, 21, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hyppanen (WO 97/46829).

Regarding claim 24, Hyppanen (FIG. 2 embodiment; page 13, line 31 to page 14, line 10; also, see page 11, line 1 to page 13, line 30) discloses a system including at least one process chamber (i.e., heat transfer chamber **218**) in connection with a fluidized bed reactor (i.e., reactor or processing chamber **212**), wherein process chamber **218** comprises:

an interior limited by side walls having a lower part and an upper part (as illustrated in FIG. 2, a left partition wall **238** and a right partition wall, not labeled), wherein the interior enables a flow of solid material;

heat exchanger means (i.e., heat transfer surfaces, not labeled in FIG. 2, but indicated by shape ☒; equivalent to heat transfer surfaces **46** in FIG. 1) provided within the interior for heat transfer from the flow of the solid material to a heat transfer medium inside the heat exchanger means (see page 1, lines 31-34);

a top closed barrier wall forming a roof of the at least one process chamber **218** (see FIG. 2);

a process chamber inlet (i.e., the opening, not labeled in FIG. 2, located at the bottom part of partition **238**) arranged in the lower part of one of the side walls; and

a process chamber outlet (i.e., opening **250**) arranged in the upper part of the other side wall;

wherein the fluidized bed reactor comprises:

a furnace and furnace walls limiting the furnace (i.e., reactor or processing chamber **212** defining a combustion chamber, and the walls, not labeled, limiting reactor chamber **212**), wherein the at least one process chamber **218** is located adjacent to at least one wall of the furnace walls (see FIG. 2); and

at least one inlet chamber (i.e., dilution chamber **216**; page 5, line 37 to page 6, line 11) for directing solid material to the process chamber inlet, wherein the inlet chamber **216** is disposed prior to the process chamber **218** in the direction of flow of solid material (see arrows in FIG. 2), and wherein the inlet chamber **216** extends in a vertical direction and ends in an open top (i.e., defined by reactor chamber outlet **226**), wherein the open top is arranged to receive the flow of solid material from the reactor chamber **212**.

As illustrated in FIG. 2, process chamber **218** and inlet chamber **216** are contained within a common housing **219**, located adjacent to the reactor chamber **212**. Thus, process chamber **218** is not shown as being located "inside the furnace of the fluidized bed reactor" as instantly claimed. However, Hyppanen further discloses,

> "The heat transfer chamber may be connected in various ways and various locations to the processing chamber so that there is solid particle exchange between the chambers. *The heat transfer chamber may in some special case even be formed within the processing chamber itself.*" (emphasis added; see page 1, lines 17-22).

> "Additional heat transfer surfaces are often arranged in a separate heat transfer chamber (HTC), *which may be a part of the processing chamber*, a separate chamber adjacent to the processing chamber or, in circulating fluidized bed reactors, part of the solid particles recycling system." (emphasis added; see page 2, lines 5-10).

Hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made to locate the process chamber inside the furnace of the fluidized bed reactor in the system of Hyppanen, on the basis of suitability for the intended use, because the shifting of the location of parts would involve routine skill in the art, as evidenced by the teachings of Hyppanen, above.

Regarding claim 4, Hyppanen discloses the top closed barrier wall of chamber **218** is arranged such that the solid material flows down onto the top of the top closed barrier wall (i.e., via opening **226**) wherein the top closed barrier wall is inclined so as to guide the solid material to the process chamber (see FIG. 2).

Regarding claim 5, the embodiment of FIG. 2 shows a means for conducting internal circulation located at or above the open top of the inlet chamber **216** (i.e., via opening **226**), but

the embodiment lacks an outlet from a return duct of external circulation located at or above the open top of the inlet chamber **216**. Hyppanen, however, discloses,

> "... it is possible to combine embodiments shown above and *introduce solid particles from an external solid particle circulation, via a return duct, and/or directly from the reactor chamber from the internal solid particle circulation therein, to the dilution chamber*. At high load solid particles may be introduced solely or mainly through the return duct... At low load conditions solid particles may be introduced solely or mainly from the internal circulation through outlet openings at lower levels in the reactor chamber walls." (emphasis added; page 17, lines 10-26).

Hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide an outlet from a return duct of external circulation to the inlet chamber **216** in the modified apparatus of Hyppanen, on the basis of suitability for the intended use, because the addition of an external solid particle circulation would support the operation of the reactor system under both high and low load conditions, as taught by Hyppanen above.

Regarding claim 7, Hyppanen (FIG. 2; page 5, line 37 to page 6, line 11) discloses the at least one process chamber **216** and at least one inlet chamber **218** are arranged next to each other.

Regarding claim 17, Hyppanen discloses the at least one inlet chamber **216** is provided with a grid (i.e., not labeled in FIG. 2, but equivalent to grid **36** in FIG. 1) including means for fluidizing the interior of the at least one inlet chamber **216** by means of a fluidizing medium fed from a windbox below the grid (page 12, lines 12-19; page 13, lines 1-12).

Regarding claims 20 and 21, Hyppanen (FIG. 2) discloses the open top of the inlet chamber **216** is provided with means for controlling the flow of the solid material into the one or more inlet chambers, the means comprising a segmented area having its own fluidizing air supply means (i.e., a separate fluidizing means below the grid, not labeled, for chamber **216**;

page 12, second paragraph).

Regarding claim 25, Hyppanen (FIG. 2) discloses the at least one process chamber **218** and the at least one inlet chamber **216** have a rear wall that is formed by the at least one wall of the furnace (e.g., as illustrated, the facing or rear wall of the reactor).

3. Claims 5, 7-12, 14, 17-21 are 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz (US 5,299,532) in view of Hyppanen (WO 97/46829).

Regarding claims 5 and 24, Dietz (FIG. 1-4) discloses a system including at least one process chamber (i.e., compartment **92a**, **92b**, **96a**, **96b** within recycle section **32a**, **32b**) in connection with a fluidized bed reactor, wherein the at least one process chamber **92a**, **92b**, **96a**, **96b** comprises:

an interior limited by side walls having a lower part and an upper part (i.e., partitions **68a/b**, **88a/b**, **90a/b**), wherein the interior enables a flow of solid material;

heat exchanger means (i.e., bank of tubes **104a**, **104b**; column 6, lines 25-29) within the interior;

a top closed barrier wall forming a roof of the process chamber (i.e., upper portion **24a''**, **24b''**; column 3, line 55 to column 4, line 7; also partition **78a**, **78b**; column 5, lines 48-54);

a process chamber inlet (i.e., opening **112a**, **112b**, **114a**, **114b**; column 6, lines 30-47) arranged in the lower part of one of the side walls (i.e., partitions **88a/b**, **90a/b**); and

a process chamber outlet (i.e., opening **106a**, **106b**, **110a**, **110b**; column 6, lines 30-47) arranged in the upper part of one of the side walls (i.e., partitions **68a/b**);

wherein the fluidized bed reactor comprises:

a furnace (i.e., comprising furnace sections **30a**, **30b**) and furnace walls limiting the furnace (i.e., walls **14a/b**, **16a/b**, **17a/b**), wherein the at least one process chamber **92a**, **92b**, **96a**, **96b**

is located inside the furnace of the fluidized bed reactor adjacent to at least one wall of the furnace walls (e.g., walls **16a/b**); and

at least one inlet chamber (i.e., compartment **94a**, **94b**; column 8, lines 11-28; FIG. 2, 4)

extending in a vertical direction for directing solid material to the process chamber inlet **112a**, **112b**, **114a**, **114b**, wherein the at least one inlet chamber **94a**, **94b** is disposed prior to the process chamber **92a**, **92b**, **96a**, **96b** in the direction of flow of the solid material.

Dietz further discloses an outlet from a return duct of external circulation (i.e., the outlets of external conduits **58a**, **58b**, carrying solid material from separators **40a**, **40b**; FIG. 1, 2) is provided at or above inlet chamber **94a**, **94b**. Dietz, however, is silent as to providing a means for internal circulation to the apparatus; namely, an open top to the at least one inlet chamber **94a**, **94b** arranged to directly receive a flow of solid material from furnace sections **30a**, **30b**.

Hyppanen discloses a system similar to the system of Dietz, wherein the system of Hyppanen (FIG. 2) comprises at least one process chamber (i.e., heat transfer chamber **218**) in connection with a fluidized bed reactor (i.e., reactor or processing chamber **212**), and an inlet chamber (i.e., dilution chamber **216**) for directing solid material to the process chamber, wherein the inlet chamber **216** is disposed prior to the process chamber **218** in the direction of flow of the solid material (see flow arrows in FIG. 2), and wherein the at least one inlet chamber **216** extends in a vertical direction (see also page 5, line 37 to page 6, line 11) and ends in an open top (i.e., defined by reactor chamber outlet **226**), wherein the open top is arranged to receive an internal flow of solid material from the reactor chamber **212**. Hyppanen teaches,

> "...it is possible to combine embodiments shown above and introduce solid particles from an external solid particle circulation, via a return duct, *and/or* directly from the reactor chamber from the internal solid particle circulation therein, to the dilution

> chamber. At high load solid particles may be introduced solely or mainly through the return duct, and outlet openings at lower levels in the reactor chamber may function as openings for recycling countercurrently by overflow superfluously discharged solid material back into the reactor chamber. At low load conditions solid particles may be introduced solely or mainly from the internal circulation through outlet openings at lower levels in the reactor chamber walls." (page 17, lines 10-26).

Thus, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide a means for internal circulation in the form of an open top to the at least one inlet chamber **94a**, **94b** in the apparatus of Dietz, on the basis of suitability for the intended use, because the addition of the means for internal solid particle circulation to the inlet chamber would support the operation of the reactor system under both high and low load conditions, as taught by Hyppanen, above.

Regarding claims 7 and 8, Dietz discloses the at least one process chamber **92a**, **92b**, **96a**, **96b** and the at least one inlet chamber **94a**, **94b** are arranged next to each other (see FIG. 2), wherein each inlet chamber **94a**, **94b** is arranged side by side with one process chamber **92a**, **92b**, **96a**, **96b** so as to form at least one set of chambers.

Regarding claim 9, Dietz (FIG. 2) discloses a first process chamber (e.g., chamber **92a**) is provided on one side of each inlet chamber (e.g., chamber **94a**) and a second process chamber (e.g., chamber **96a**) is provided on another side of each inlet chamber 94a so as to form a set of chambers **92a-94a-96a**, and wherein each inlet chamber **94a** is arranged to deliver solid material to the first and second process chambers **92a** and **96a**.

Regarding claim 10, Dietz (FIG. 2) discloses one process chamber (e.g., process chamber **96a** or **92b**) is positioned between two inlet chambers (i.e., chambers **94a** and **94b**) so as to form

a set of chambers **94a-96a/92b-94b**, and wherein the two inlet chambers **94a,94b** are arranged to deliver solid material to the one process chamber **96a/92b**.

Regarding claim 11, Dietz (FIG. 4) discloses one process chamber (e.g., chamber **96a, 92b**) is provided between a first inlet chamber **94a** and a second inlet chamber **94b** so as to form a set of chambers. The collective teachings of Dietz and Hyppanen are silent as to the first inlet chamber **94a** being connected to the internal circulation of the solid material, and the second inlet chamber **94b** being connected to the external circulation. Hyppanen, however, teaches

> "At high load solid particles may be introduced solely or mainly through the return duct, and outlet openings at lower levels in the reactor chamber may function as openings for recycling countercurrently by overflow superfluously discharged solid material back into the reactor chamber. At low load conditions solid particles may be introduced solely or mainly from the internal circulation through outlet openings at lower levels in the reactor chamber walls." (page 17, lines 10-26).

Thus, depending on whether the reactor system were operating under high or low load conditions, it would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the first inlet chamber **94a** to be connected to the internal circulation of solid material and to configure the second inlet chamber **94b** to be connected to the external circulation of solid material in the modified system of Dietz, because where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

Regarding claims 12 and 14, Dietz (FIG. 2, 4) discloses,

one inlet chamber (e.g., chamber **94a**) is provided between a first process chamber (e.g., chamber **92a**) and a second process chamber (e.g., chamber **96a**) so as to form a set of chambers;

division walls (i.e., partitions **88a**, **90a**) separate the first and second process chambers **92a**, **96a** from the one inlet chamber **94a** and the division walls are arranged substantially perpendicular to the at least one wall;

inlets (i.e., openings **112a**, **114a**; see FIG. 4) to the first and second process chambers **92a**, **96a** are provided at lower parts of the division walls **88a**, **90a**;

said set of chambers **92a-94a-96a** including a common front wall (i.e., partition **68a**; see FIG. 2) arranged substantially parallel to the at least one wall;

outlets (i.e., openings **106a**,**110a**; see FIG. 4) of the first and second process chambers **92a**,**96a** are arranged in the upper part of the front wall **68a**; and

an outlet of the external circulation of the solid material from a return duct (i.e., the outlet of external conduits **58a**, carrying solid material from separators **40a**; FIG. 1, 2) is arranged in the at least one wall (i.e., wall **16a**) at or above the open top of the inlet chamber **94a**.

Regarding claim 17, Dietz (FIG. 4) discloses the at least one inlet chamber **94a**, **94b** is provided with a grid (i.e., plate **22a**, **22b**) including means for fluidizing the interior of the at least one inlet chamber (i.e., nozzles **98a**, **98b**) by means of a fluidizing medium fed from a windbox below the grid (i.e., plenum **28a**, **28b**).

Regarding claims 18 and 19, Dietz (FIG. 4) discloses the at least one inlet chamber **94a**,**94b** is provided with a grid (i.e., plate **22a**, **22b**) including means for fluidizing the interior of the at least one inlet chamber (i.e., nozzles **98a**, **98b**) by means of a fluidizing medium fed from a windbox below the grid (i.e., plenum **28a**, **28b**), the windbox being divided into separate sections, each of said sections having its own means for fluidizing medium feed (i.e., separate plenum sections **28a** and **28b**).

Regarding claims 20 and 21, Dietz (FIG. 4) discloses the inlet of at least one inlet chamber **94a**, **94b** is provided with means for controlling the flow of the solid material into the inlet, the means comprising a segmented area having its own fluidizing air supply means (i.e., taller nozzles **100a**, **100b**, with manifold **102a**, **102b**; column 8, lines 11-28).

Regarding claim 23, Dietz (FIG 2) discloses the at least one set of chamber comprises two sets of chambers (e.g., a first set comprising inlet chamber **94a** and processing chamber **96a**, and a second set comprising inlet chamber **94b** and process chamber **92b**) provided side by side adjacent to the rear wall (i.e., wall **16a**,**16b**) of the reactor furnace, wherein a particle separator system (i.e., comprising separators **40a**, **40b**; conduits **58a**, **58b**; column 8, lines 11-28) in connection with the external circulation of solid material is divided to feed the flow of solid material to said two sets of chambers.

Regarding claims 25 and 26, Dietz (FIG. 2) discloses the at least one process chamber **92a**, **92b**, **96a**, **96b** and the at least one inlet chamber **94a**, **94b** have a rear wall (i.e., wall **16a**, **16b**) that is formed by the at least one wall of the furnace.

Response to Arguments

4. Applicant's arguments filed on November 29, 2004 have been fully considered but they are moot in view of the new ground(s) of rejection, necessitated by amendment.

Allowable Subject Matter

5. Claims 13 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose or adequately teach a system further comprising the recited inlet chamber wall configuration of claim 13, wherein the top

closed barrier walls of the first and second process chambers are inclined in a manner such that the top closed barrier walls slant towards the open top of the inlet chamber. Additionally, the prior art does not disclose or adequately teach a system further comprising the recited fluidizing air supply means of claim 22, wherein said means comprises a U-shaped tube system placed inside a U-shaped groove, located at the top of the at least one open-top inlet chambers.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung
February 8, 2005

Hien Tran

HIEN TRAN
PRIMARY EXAMINER